Acta Arachnologica, 52(2): 77–78, December 31, 2003

[Short Communication]

First record of a mermithid nematode emerging from the wolf spider *Pardosa pseudoannulata* (Araneae: Lycosidae)

Hiroyuki Iida[1] & Hideo Hasegawa[2]

[1] *Laboratory of Insect Ecology, Graduate School of Agriculture,*
Kyoto University, Kyoto, 606–8502 Japan
E-mail; iida@kais.kyoto-u.ac.jp
[2] *Department of Infectious Diseases, Oita Medical University,*
Hasama, Oita, 879–5593 Japan
E-mail; hasegawa@oita-med.ac.jp

Abstract — Juveniles of a nematode belonging to the family Mermithidae were found from wolf spiders, *Pardosa pseudoannulata*, collected in a paddy field in Kyoto, Japan. Their morphological characteristics are briefly reported along with some ecological notes. This is the first record of a mermithid from *P. pseudoannulata*.

Key words — mermithid juvenile, Nematoda, parasite, host, *Pardosa pseudoannulata*

The wolf spider, *P. pseudoannulata*, is a wandering species that mainly inhabits rice fields. The average adult body length is 10–12 mm for females and 8–9 mm for males (Yaginuma 1986). During an ecological survey, large nematodes (Fig. 1) were found to emerge from the spiders. Since there are no reports of nematode infection in *P. pseudoannulata*, its morphology is briefly recorded here, along with a discussion of its ecology.

Adult and subadult wolf spiders were collected in a paddy field in Kyoto (ca. 35°N, 135°E), Japan, from 1995 to 2003. They were reared individually in plastic cups (100 mm diameter and 45 mm deep) with a piece of moist cotton to supply humidity, in a laboratory maintained at 25°C, with a 16L: 8D light cycle. The spiders were fed greenbottle flies, *Phaenicia cuprina* and *P. sericata*, and small brown planthoppers, *Laodelphax striatellus*. Nematodes that emerged from the spiders were fixed in 70% ethanol. For microscopic examination, they were cleared in glycerol-alcohol solution by evaporating the alcohol.

A total of 22 nematodes emerged from 12 female adult spiders, whereas males hosted no nematodes. In most cases, only one worm appeared from each host, but in two exceptional cases, two and ten nematodes emerged, respectively. Infected spiders had a swollen and sometimes lopsided abdomen. The spiders were usually dead at the time of nematode emergence, except in two cases. The presence of the parasite might be the cause of death, because the worms consume the internal organs of the hosts (Leech 1966, Poinar 1985).

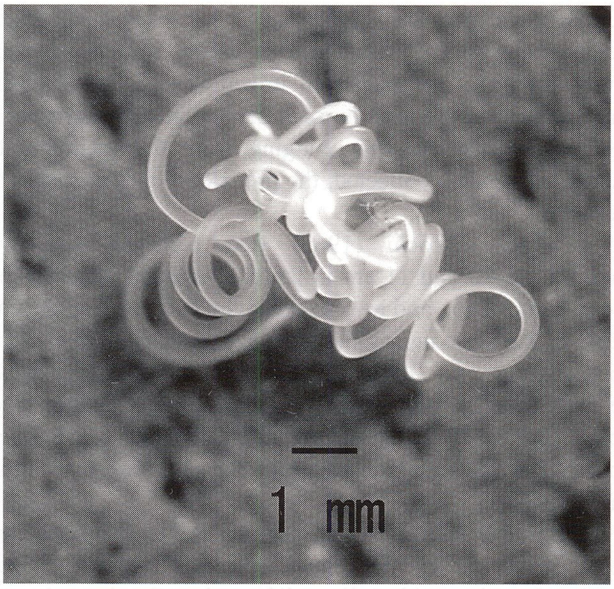

Fig. 1. One of the mermithid nematodes that emerged from female adults of *P. pseudoannulata.*

The worms were white to ivory yellow in color, 14–159 mm long, and up to 0.60 mm wide. The head had six cephalic papillae, but lacked lateral lip papillae. Six hypodermal cords were present; fine cross fibers existed in the cuticle. The tail had a pointed appendage. Based on these morphological characteristics, it is apparent that these worms were juveniles of a nematode belonging to the family Mermithidae (Poinar 1977).

As larvae, mermithid nematodes infest arthropods, usually insects, but also spiders and harvestmen, and mature after their emergence from their hosts (Hyman 1951). Mermithids have been recorded from more than 40 species of spiders worldwide, but only a few of the nematodes have been identified to the generic or species level because the worms emerged were juveniles (Poinar 1985). Similarly, it was impossible to determine the genus of the juveniles that we observed, although the following genera can be excluded based on the key provided by Poinar (1977, 1979): *Allomermis, Eumermis, Hydromermis, Mermis, Octomermis, Orthomermis, Pheromermis, Phreatomermis*, and *Quadrimermis*. Moreover, it is unlikely that the species belonged to the genus *Aranimermis*, established by Poinar (1986) for a mermithid that is parasitic in spiders, as juveniles of this genus usually lack prominent tail appendages.

Spiders of the genus *Pardosa* have been reported as hosts of mermithids in various localities (Poinar 1985). Leech (1966) found mermithids in 1% of *Pardosa glacialis* in Hazen Camp (81°49′N, 71°18′W), and suggested that the actual prevalence was higher, as it was very difficult to demonstrate minute nematodes in young spiders. In our study, the exact prevalence of infection could not be estimated, because the total number of *P. pseudoannulata* collected was not recorded. Judging from the approximate number of spiders collected, the prevalence was somewhere between 1 and 10%.

In Japan, Okochi (1969) first reported that two mermithids, 10 and 11 cm in length, respectively, emerged from *Pardosa* sp., and he also listed the following spiders as hosts of the same nematode: *Oxyopes sertatus, Misumenops tricuspidatus*, and *Tetragnatha praedonia*. Matsuda (1999) recently found a mermithid in *Pardosa suwai*. Presumably, some ecological or behavioral characteristics of *Pardosa* spiders provide suitable conditions for acquiring mermithid infection.

Mermithids parasitic in spiders are thought to have two types of life history: direct and indirect life cycles (Poinar 1985). Parasites with a direct life cycle infest hosts by direct penetration of the integument, whereas nematodes with indirect life cycles infest the second hosts by infesting the prey of spiders in water (Poinar 1985). It is presumed that our mermithid has an indirect life cycle, because the host spider has frequent opportunity to acquire infection by feeding on prey that is infested with mermithids in paddy fields. Further study is necessary to elucidate the life cycle and determine the generic position of this mermithid.

Acknowledgments

We wish to thank Dr. K. Fujisaki, Kyoto University, for his valuable suggestion. We also thank Drs. J. Araki, Meguro Parasitological Museum, H. Ikeda, Seisho High School, Kanagawa Prefecture and S. Shimano, National Agricultural Research Center for Tohoku Region, for providing valuable information on nematodes, and to Dr. T. Matsui, Experimental Farm, Kyoto University, for providing rough rice used for food of planthoppers.

References

Hyman, L. H. 1951. The Invertebrates. Vol. Acanthocephala, Aschelminthes and Entoprocta. The Pseudocoelomate Bilateria. McGraw-Hill Book Co., New York, 572 pp.

Leech R. E. 1966. The spiders (Araneida) of Hazen Camp 81°49′N, 71°18′W. Quaest. Entomol., 2: 153–212.

Matsuda, M.1999. Two intersexual spiders of family Lycosidae (Araneae) from Japan. Bull. Higashi Taisetsu Mus. Nat. Hist., 21: 51–54. (In Japanese)

Okochi, T. 1969 Reports on parasites of spiders. Kishidaia, 9: 2 (In Japanese)

Poinar, G. O., Jr. 1977. CIH Key to the Groups and Genera of Nematode Parasites of Invertebrates. Commonwealth Agricultural Bureaux, Farnham Royal, Buckinghamshire, England. 43 pp.

Poinar, G. O., Jr. 1979. Nematodes for biological control of insects. CRC Press, Boca Raton, Florida, U.S.A. 277 pp.

Poinar, G. O., Jr. 1985. Mermithid (Nematoda) parasites of spiders and hervestmen. J. Arachnol., 13: 121–128.

Poinar, G. O., Jr. 1986. *Aranimermis aptispicula* n. g., n. sp. (Mermithidae: Nematoda), a parasite of spiders (Arachnida: Araneida). Systematic Parasitology, 8: 33–38.

Yaginuma, T. 1986. Spiders of Japan in Color (new ed.). Hoikusha Publ., Osaka. 305 pp. (In Japanese)

Received August 7, 2003 / Accepted September 1, 2003

Acta Arachnologica Vol. 52, No. 2 掲載論文の和文要旨

キクヅキコモリグモから出現した糸片虫科線虫（pp. 77–78）

飯田博之[1]・長谷川英男[2]（[1]〒606-8502 京都市左京区北白川追分町　京都大学大学院農学研究科昆虫生態学研究室；[2]〒879-5593 大分県大分郡挾間町医大ヶ丘1丁目1番地 大分医科大学感染分子病態制御研究室）

京都市内の水田で採集したキクヅキコモリグモ *Pardosa pseudoannulata* を飼育していたところ，12頭のクモから計22頭の糸片虫科線虫が出てきた．宿主は全て雌成体だった．ほとんどの場合，1頭のクモに寄生していた線虫は1頭だった．しかし，1頭のクモに2頭および10頭の線虫が寄生していた場合もそれぞれ1例ずつあった．また12頭の宿主のうち，線虫が出た後も生きていた個体は2頭だった．線虫の体長は14～159 mmであった．Poinar（1977, 1979, 1986）に基づき線虫の同定を試みたところ，その形態的特徴から *Mermis, Octomermis, Orthomermis, Allomermis, Pheromermis, Eumermis, Phreatomermis, Hydromermis, Quadrimermis, Aranimermis* 属ではないことは判明したが，幼体であったのでこれ以上同定することはできなかった．寄生率については，採集個体のおおよその数から判断すると，1～10%の範囲内であると推測できた．世界では40種以上のクモ類から糸片虫科線虫が見つかっているが，キクヅキコモリグモからの報告例はまだない．糸片線虫科の線虫は幼体のステージで寄生している（Hyman 1951）．したがって，宿主から出た直後はまだ幼体であるため種の同定はできない．今後，線虫の種を同定するためには，Poinar（1986）のように宿主から出た線虫を成虫にまで育てる必要があるだろう．

***Oxyptila atomaria*（クモ目，カニグモ科）の日本からの発見**（pp. 79–81）

小野展嗣[1]・松田まゆみ[2]（[1]〒169-0073 東京都新宿区百人町3-23-1　国立科学博物館動物研究部内；[2]〒080-1403 北海道河東郡上士幌町糠平北区25）

土壌性のカニグモ科の1種 *Oxyptila atomaria*（Panzer 1801）（アトムオチバカニグモ―新称―）を，北海道において主にピットホールトラップを用いて採集された標本に基づいて日本から初めて記録し，両性の生殖器を図示した．本種はヨーロッパから，シベリア，韓国，日本とユーラシア大陸北部に広く分布するが，同大陸東部では比較的稀であると思われる．

北海道産のカイゾクコモリグモ属（クモ目：コモリグモ科）の1新種（pp. 83–84）

田中穂積（〒661-8520 兵庫県尼崎市南塚口町7-29-1　園田学園女子大学生物学研究室）

北海道天塩郡サロベツ原野，苫小牧市弁天沼やウトナイ湖等の湿原より得られたコモリグモ科カイゾクコモリグモ属の1新種を *Pirata hokkaidensis* ミズベコモリグモ（新称）と命名して記載した．本種は中国に分布する，*Pirata serrulatus* Song & Wang 1984 に近似するが，雄触肢中部把持器基部の突起がないことによって区別できる．

北ボルネオ産ヒメグモ科（クモ綱：クモ目）の1新属および3新種（pp. 85–89）

吉田　哉（〒990-2484 山形市篭田2丁目7番16号）

北ボルネオから1新属 *Deelemanella* および3新種 *D. borneo, Molione christae, M. kinabalu* を記載した．*Deelemanella*（イソウロウグモ亜科）は雄の背甲の頭部に1つの突起があり，腹部が扁平で背面に数対の突起があることにより他の属から区別できる．*Molione*（ヒメグモ亜科）はこれまで腹部背面に刺状の突起がある3種が知られているが，本稿で記載した2種は腹部背面に突起がない．

アジア産トゲオオザトウムシ亜科数種の正体とシノニム（ザトウムシ目，マザトウムシ科）（pp. 91–102）

Wojciech Staręga（Instytut Biologii Akademii Podlaskiej, Poland）

多数のタイプ標本と原記載にもとづきトゲオオザトウムシ亜科（Opilioninae）の分類学的改訂をおこなった．いくつかの転属と多数のシノニムが含まれる．本亜科は次の属からなる：*Bidentolophus, Egaenus, Himalphalangium, Homolophus, Opilio, Scleropilio*．ほとんどの属と種は中央アジアと東アジアに分布し，アジア西部とヨーロッパには数種が到達しているのみである．次の種については転属をおこなった：*Egaenus pakistanus*（Roewer），*Himalphalangium spinulatum*（Roewer）（＝ゴホントゲザトウムシ），*Homolophus serrulatus*（Karsch），*Bidentolophus adungius*（Roewer），*Homolophus consputus*（Simon），*H. nigridorsus*（Caporiacco），*H. turcicus*（Roewer）（最後の3種はやや不明確），*H. martensi*（Staręga）（以上，転属後の学名）．新しくシノニムとなったのは次のとおり（等号の前が新参シノニム）：*Egaenus carpaticus* Avram = *E. convexus*（C. L. Koch），*Euphalangium afganum* Roewer と *E. chitralense* Roewer = *Egaenus kashmiricus* Caporiacco, *Opilio nigerrimus* Schenkel = *Himalphalangium spinulatum*（Roewer）（ゴホントゲザトウムシ），*Phalangium tricolor* Kulczyński（サンショクザトウムシ），*P. bidentatum* Kulczyński, *Opilio Kishidai* Saitô（キシダザトウムシ），*O. quadridentatus* Wang, *Opilio tricolor* var. *modestus* Schenkel = *Homolophus serrulatus*（Karsch），*Opilio hexa-spinulatus* Saitô と *Oliio koreaus* Charitonov = *Bidentolophus bidens*（Simon），*Opilio birmanicus* Roewer = *Bidentolophus adungius*（Roewer），*Opilio sunuitensis* Nakatsudi（ソニットザトウムシ）と *Opilio nipponensis* Roewer = *Homolophus arcticus* Banks（ウデブトザトウムシ），*Euphalangium trinkleri* Roewer と *Opilio insolitus* Roewer = *Homolophus tibetanus*（Roewer）．*Phalangium coronatum* Redikorzev，と *Opilio redikorzevi* Roewer = *Opilio lederi* Roewer, *Opilio turcicus* Roewer = *Opilio saxatilis* C. L. Koch, *Opilio reginae*